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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/737,397	12/15/2000	Yasuaki Tsuchiya	14162	8837
23389	7590	11/18/2004		
SCULLY SCOTT MURPHY & PRESSER, PC 400 GARDEN CITY PLAZA GARDEN CITY, NY 11530			EXAMINER GUERRERO, MARIA F	
			ART UNIT 2822	PAPER NUMBER

DATE MAILED: 11/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/737,397

Applicant(s)

TSUCHIYA ET AL.

Examiner

Maria Guerrero

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 3,4,6,7,13-22,33,35,36,39 and 41-45 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 3-4, 6-7, 13-22, 33, 35-36, 39, and 41-45 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. This Office Action is in response to the Amendment and the Request for continued examination filed October 21, 2004.

#### **Status of Claims**

2. Claims 1-2, 5, 8-12, 23-32, 34, 37-38, 40 are canceled. Claims 3-4, 6-7, 13-22, 33, 35-36, 39, and 41-45 are pending.

#### ***Continued Examination Under 37 CFR 1.114***

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 21, 2004 has been entered.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 3-4, 6-7, 13-22, 33, 35-36, 39 and 41-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cadien et al. (U.S. 5,516,346) in view of Kaufman et al. (U.S. 6,063,306).

Cadien et al. teaches forming a concave in an insulating film formed on a substrate, forming a barrier layer, forming an interconnect metal film (copper or copper alloy) over the whole surface, polishing the surface by a first and second polishing processes until the surface of the insulating film other than the concave is exposed (Fig.4a-4c, col. 10, lines 5-20). Cadien et al. discloses using a polishing slurry comprising silica polishing material and an inorganic salt (fluoride salt) and an oxidizing agent (Abstract, col. 3, lines 1-5, col. 7, lines 1-10, 20-50, col. 8, lines 50-68).

Cadien et al. does not specifically show the polishing-rate ratio as claimed. However, Cadien et al. teaches controlling the etching rate of the barrier layer and the interconnect metal and controlling the etching rate of the interconnect metal and the insulating film (col. 7, lines 50-65, col. 8, lines 17-45, col. 9, lines 1-45).

Regarding claims 3-4, 6-7, 13-27, 33, 35-36, 39, and 41-45, Cadien et al. fails to show the polishing slurry comprising an alkanolamine, a carboxylic acid, and benzotriazole. Cadien et al. fails to show the barrier film being a tantalum-containing metal film. However, Kaufman et al. shows applying a first slurry comprising an alkanolamine (such as, triethanolamine) and second slurry comprising carboxylic acid (such as, tartaric acid) in a polishing process as well known in the art. Kaufman et al. also teaches the slurry comprising benzotriazole and the barrier film being a tantalum-containing metal film (Abstract, col. 4, lines 15-67, col. 6, lines 2-45, col. 8, lines 20-45, col. 10, lines 50-65, TABLE 1, 4, col. 15, lines 25-65, col. 16, lines 48-67).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Cadien et al. reference by specifying the polishing

rate as claimed and by including the specific compounds taught by Kaufman et al. in other to provide effective polishing at desired rates while minimizing surface imperfections and defects (Kaufman et al., col. 12, lines 10-15).

### ***Response to Arguments***

5. Applicant's arguments filed February October 21, 2004 have been fully considered but they are not persuasive. Claims 3-4, 6-7, 13-22, 33, 35-36, 39 and 41-45 stand rejected.

Applicant argued that after practicing the first polishing step recited in claims 3 and 6, the interconnect metal film (i.e., Cu-based film) is partially on the surface in locations other than in the concave portion. Applicant argued that, on the contrary Cadien et al. discloses that the first polishing step continues until substantially all tungsten layer formed on Tin layer is removed. However, claims 3 and 6 do not recite the interconnect metal being a copper-based film. Cadien et al. also teaches the interconnect metal having films (306 and 308) and part of the interconnect metal remains on the surface other than the concave (Fig. 3b, col. 5, lines 1-40, col. 8, lines 16-60).

Regarding the second slurry composition and the barrier layer being tantalum, Kaufman et al. shows second slurry comprising carboxylic acid (such as, tartaric acid) in a polishing process as well known in the art and the use of tantalum (col. 7, lines 22-40, col. 8, lines 10-20).

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., alkanolamine, which may reduce the polishing rate for the barrier metal film while increasing the difference in the polishing rate between the barrier metal film and the interconnect metal film in order to enhance the function of the barrier metal film as a polishing "stopper") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Furthermore, during patent examination, the pending claims must be "given \*>their< broadest reasonable interpretation consistent with the specification." > In *re Hyatt*, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000). While the claims of issued patents are interpreted in light of the specification, prosecution history, prior art and other claims, this is not the mode of claim interpretation to be applied during examination. During examination, the claims must be interpreted as broadly as their terms reasonably allow. > In *re American Academy of Science Tech Center*, F.3d , 2004 WL 1067528 (Fed. Cir. May 13, 2004)(The USPTO uses a different standard for construing claims than that used by district courts; during examination the USPTO must

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give claims their broadest reasonable interpretation.) < This means that the words of the claim must be given their plain meaning unless applicant has provided a clear definition in the specification. In re Zletz, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989) >; Chef America, Inc. v. Lamb-Weston, Inc., 358 F.3d 1371, 1372, 69 USPQ2d 1857 (Fed. Cir. 2004).

### ***Conclusion***

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is 571-272-1837.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
**MARIA F. GUERRERO**  
**PRIMARY EXAMINER**

November 12, 2004